

Approved by:		
	General Manager	Radiation Safety Officer

STANDARD OPERATING PROCEDURE

15.OPS.20

HANDLING OF LIQUIDS CONTAINING RADIOACTIVE MATERIALS

1.0 OBJECTIVE

To define methods and procedures for accepting and handling liquids containing radioactive materials.

2.0 SCOPE

This standard operating procedure (SOP) applies to the handling of liquids containing radioactive material for treatment and disposal at the Clean Harbors Deer Trail (CHDT) facility.

3.0 POLICY

Liquids containing radioactive materials will be handled in a manner to minimize the potential for spills, and maintain worker and public exposures as low as reasonably achievable (ALARA).

4.0 RESPONSIBILITIES

Responsibilities of the CHDT Radiation Safety Officer (RSO), management, and staff are defined in the CHDT Radiation Protection Plan (15.RPP.01).

5.0 GENERAL PROCEDURES

5.1 Liquid Waste Receipt

Liquid wastes will typically be shipped in drums, totes, tankers, or vacuum boxes. Drums and totes will typically arrive on-site in covered semi-trailers, while tankers and vacuum boxes will be self-contained. All wastes will be received in accordance with SOP 15.WAC.02, *Waste Tracking*.

5.2 Treatment of Liquids

Treatment operations will be conducted according to the provisions of SOP 15.OPS.02, *Contamination Control During Waste Treatment Activities*. Liquid wastes are turned into solids suitable for landfill by the addition of Pozzolanic reagents such as cement kiln dust, Portland cement, lime, lime kiln dust, and fly ash. Pozzolanic reagents function not just by absorption but also by chemically combining with free water in the waste to form a stable solid. Specific treatment formulas will be dependent upon the specific components of the waste stream and will be created on a case-by-case basis and documented as part of the approved waste profile. Liquids with radioactive materials will be treated in a dedicated (marked and restricted) section of the Treatment Building. This section of the Treatment Building will remain dedicated for radiological use until decontaminated and released in accordance with SOP 15.OPS.13, *Equipment and Vehicle Release Surveys*.

5.2.1 Tanker and Vacuum Box Unloading Operations

Facility personnel will direct the transporter to the radioactive materials unloading area. Unloading areas will be surveyed daily when in use and decontaminated if necessary. The truck will back into the unloading area directly up to the edge of the basin. The truck will dump the waste directly into the treatment basin until the tank is empty. The truck tires will not be routinely surveyed for radiation contamination since the truck is traveling only on clean unloading areas that are surveyed daily (i.e., truck tires will not contact radioactive materials) and since a survey of the dedicated treatment area will be performed daily while operations involving radioactive materials are conducted. If the truck tires contact radioactive material (e.g., radioactive material is spilled on the floor during unloading), the truck shall be surveyed per SOP 15.OPS.13, *Equipment and Vehicle Release Surveys*. If radioactive material is detected, the truck tires shall be decontaminated by washing with water, and the rinsate will be directed into the treatment basin.

5.3 Small Container Unloading Operations

Drums will normally be unloaded using a drum-tipping machine. This machine has arms that grab the drum by the side. Drums will have the lids removed or the bungs opened. They will then be picked up by the drum tipper, turned upside down, and dumped into the treatment basin. Tote tanks will normally be unloaded using the bottom outlet and the liquid waste will be drained into the treatment basin. Empty containers will be crushed and disposed of in the landfill, filled with absorbent and disposed of in the landfill, or decontaminated for other uses per SOP 15.OPS.18, *Decontamination of Surfaces and Equipment*. All free liquids will be removed from the containers prior to crushing. If there is residual non-pourable material adhering to the sides of the container, absorbent such as cement kiln dust will be added to the container to ensure that no non-solid waste remains. Crushing of containers will preferentially take place in the landfill, in the treatment basins, and on the floor of the treatment building in that order.

Work will be done in a posted area in the treatment building with air monitoring as required for treatment. After containers are smashed, they will be loaded into haul trucks for transport to the landfill or placed in the treatment basin along with solidified waste to await transport to the landfill. When container processing is finished, the concrete floor will be washed with water with the water draining into the treatment basin and solidified. After washing, the floor will be surveyed for residual contamination and decontaminated if necessary. Equipment and personnel will be surveyed for contamination as per CHDT procedures and decontaminated as necessary.

5.4 Mixing Operations

Mixing operations in the treatment building are conducted using a backhoe and chemical reagent additives, typically cement kiln dust or other Pozzolanic reagents. Normally, the waste is placed in the treatment basin, reagents are added, and the waste mixture is mixed until treatment (solidification) is complete. The treatment building is a totally enclosed building with two emission control systems consisting of a bag house and a wet scrubber. All treatment operations must be conducted with the emission control system properly operating to control releases of waste materials. Mixing Operations and hauling the treated waste to the landfill will be conducted according to the provisions of SOP 15.OPS.02 *Contamination Control During Waste Treatment Activities*

5.5 Release of Liquid Containers

A radiological release survey per 15.OPS.13, *Equipment and Vehicle Release Surveys*, will be performed prior to return of the container. This procedure will most likely be performed for large tankers and vacuum tankers. For containers that are not to be returned to the generator, the containers will be disposed in the active CHDT disposal cell. The release process will be performed by an evaluation of the radiological conditions of accessible areas. Smear and direct surveys of the inlet, outlet, cleanouts, and other access points will be performed. The use of remote survey equipment such as extendable Geiger Mueller (GM) probes and smear collection devices are encouraged. If the results of the surveys of the accessible areas indicate radioactivity levels consistent with background, no further survey is required. If contamination is detected, further surveys of the equipment will be directed by the RSO. Decontamination methods include, but are not limited to, entry into the tanker to perform physical decontamination and release and/or performing an interior rinsing of the tanker. Interior rinsing of the tanker will consist of collecting additional water and discharging the rinsate into the treatment basin until the rinsate is visually clear and re-surveying the accessible areas until the results indicate contamination levels are consistent with background.

6.0 REFERENCES

None.